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Dr. LEE, President, in the Chair.

S. H. Miller, Esq., Wisbeach;

Rev. J. E. Cross, Appleby, near Brigg, Lincolnshire; and

John Newton, Esq., Well Street,

were balloted for and duly elected Fellows of the Society.

J. S. S. Glennie, Esq., was balloted for and re-elected a Fellow of the Society.

*Announcement of New Instruments about to be supplied by
Government to the Great Trigonometrical Survey of India.*
By Lieut.-Colonel A. Strange.

It may interest the Society to be informed that the more purely scientific operations of the Great Trigonometrical Survey of India are about to receive an impulse by the addition of several important Instruments, namely,—

- 1 Great Theodolite, with a 3-feet Horizontal Circle.
- 2 Zenith Sectors.
- 3 Transit Instruments.
- 3 Astronomical Clocks.
- 3 Galvanic Registers.

Negotiations for the supply of these Instruments are now in progress, and the Secretary of State for India in Council has done me the honour to intrust the superintendence of their construction to me.

I have been engaged for a considerable period in preparing the design for the Great Theodolite, the working drawings of which, in nine large sheets, and a voluminous specification, are now completed, and embrace the most minute details. Though

based on brief notes by Sir Andrew Scott Waugh, the late Surveyor-General of India, and practically carried out by me, this design comprehends the suggestions of many minds. The endeavour has been to engraft on the excellencies of existing theodolites of the first class, all that the experience of thirty years or more has shown to be desirable, and modern science has rendered possible of achievement, for increasing the power, efficiency, and convenience of the new Instrument. It will present some features of novelty and value sufficient perhaps from time to time to engage the interest of the Society.

The form, size, and arrangements of the other Instruments above enumerated, are still under consideration.

Major J. T. Walker, of H. M. Indian Engineers, the present able Superintendent of the Great Trigonometrical Survey, proposes to employ the Zenith Sectors for adding to the number of points on the Great Meridional Arc of India, the latitudes whereof have been astronomically determined. At present there exist in the northern and more modern portion of this Arc, executed by Sir George Everest, only three such points in an extent of $11^{\circ} 28'$, subdividing the entire Arc into two sections whose amplitudes are respectively $5^{\circ} 24'$ and $6^{\circ} 4'$. Sir Henry James, Superintendent of the Ordnance Survey of Great Britain, suggests that an observed latitude at every degree "would have added very greatly to the weight of the determination of the Earth's figure, and would, besides, have thrown much light upon the question of Himalayan influence." The same object will probably lead Major Walker to use these instruments wherever facilities for doing so profitably are afforded by the extensive and accurate triangulation now spread over a large portion of the Indian peninsula.

The Transit Instruments, Clocks, and Galvanic apparatus, are intended for the determination of longitudes by Electric Telegraph. Major Walker expressly points to the possibility, at no distant date, when certain telegraphic lines now in progress are completed, of ascertaining the absolute difference of Longitude between Greenwich and Kurrachee in Scinde, and thence the true Longitude of every point in India fixed by the Great Triangulation. And he justly observes that "the importance of such a desideratum can scarcely be over-estimated, not only to Science, but also to Navigation, in furnishing the most accurate basis possible for Maritime Charts." This step having been gained, we cannot pause until the Eastern Archipelago, China, and the Australian Colonies, by being linked in the chain, shall cease to present those dangers to seamen which are incident to uncertainty in the longitude.

I may add the hope that the same method will be employed to render available as a geodesic datum the Arc of Parallel*

* This Arc is designated "*The Great Longitudinal Series, Western Section.*" It was commenced in the season 1848-49, and completed 1852-53. The first eighty miles (at the eastern extremity) was executed by Major

lying between Seronj, in Central India, and Kurrachee, in Scinde, comprising about $10\frac{1}{2}$ degrees of longitude, the triangulation of which was executed with the same high class of instrument, and according to the same rigorous system with which Sir George Everest's Great Meridional Arc was measured. It is verified by a Base-line at either extremity, as well as by frequent astronomical determinations of the Azimuth along its course. The character of this work, and its comparative proximity to the Equator (N. latitude about 25°), will constitute it, when completed by the telegraphic observation of the difference of longitude of its extremities and of various points in its length, a valuable accession to the existing meagre array of Arcs of Parallel of the first order.

It is to be regretted that though a chain of triangles connects Seronj in Central India, and Calcutta, and is therefore nominally a continuation of the Arc of Parallel just referred to, this Eastern section cannot properly be combined with the Western for geodesic purposes. In speaking of this work, Sir Andrew Waugh, whilst giving Mr. Olliver, by whom it was executed, full credit "for his indefatigable exertions under difficult circumstances," adds that, "on account of the defective state of instrumental equipments, the professional value of the work is only of a secondary or tertiary order."* The work was carried on during the absence in Europe of Sir George Everest, then Surveyor-General, prior to the introduction of his admirably organised system, and in days when the supply of superior instruments was not so readily conceded as it since has been. In order to place the Eastern on a par with the Western section, the entire triangulation of the former must be executed *de novo* in the modern style and with appropriate apparatus. The line crosses an insalubrious and difficult tract, it is true, but no work of this kind is free from great obstacles. It is to be hoped that, as the terminal Base-lines at Calcutta and Seronj respectively, which constitute so important and costly a branch of such undertakings, are already measured, and as the Western section is complete, the revision of the Eastern section may eventually be justified by the consideration that the two sections combined will confer on mathematical science a contribution so magnificent as that of a continuous Arc of Parallel of the first order, 21 degrees in length.

London, 13th May, 1862.

Renny Tailyour, Bengal Engineers, and the rest by me. This work constitutes, perhaps, the first example of a true Desert being successfully traversed by a great triangulation.

* Return to the House of Commons, Trigonometrical Survey, India, 15th April, 1851, pp. 5, 6.